PAN11-4/-5 Smart energy plug in switch

ON/OFF Button
LED indicator

SPEAKS Z-WAVE®
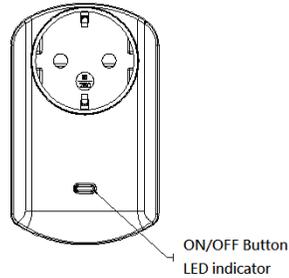
This plug-in ON/OFF switch PAN11 is a wireless switch, based on Z-Wave technology. Z-Wave™ enabled devices displaying the Z-Wave™ logo can also be used with it regardless of the manufacturer, and can also be used in other manufacturer's Z-Wave™ enabled networks. Remote On/Off control of the connected load is possible with other manufacturer's wireless Controller. Each switch is designed to act as a repeater. Repeaters will re-transmit the RF signal to ensure that the signal is received by its intended destination by routing the signal around obstacles and radio dead spots.

This plug-in ON/OFF switch is able to detect current wattage (5~1500W) and overload wattage (1550~1700W) of connected lights or appliances. When detecting overload state, the Switch will be disabled and its On/Off button will be lockout of which LED will flash quickly. However, unplug and re-connect the switch will reset its

overload condition to normal status.

Adding to Z-Wave™ Network

In the front casing, there is an On/Off button with LED indicator which is used to toggle switch on and off or carry out inclusion, exclusion, reset or association. When first power is applied, its LED flashes on and off alternately and repeatedly at 2-second intervals. It implies that it has not been assigned a node ID and cannot work with Z-Wave enabled devices.

Auto Inclusion

The function of auto inclusion will be executed as long as the switch does not have Node ID and just plug the switch into a wall outlet.

Note: Auto inclusion timeout is 4 minute during which the node information of explorer frame will be emitted once every 5 seconds. Unlike "inclusion" function as shown in the table below, the execution of auto inclusion is free from pressing the On/Off button on the Switch.

The table below lists an operation summary of basic Z-Wave functions. Please refer to the instructions for your Z-WaveTM Certificated Primary Controller to access the Setup function, and to include/exclude/associate devices

Function	Description	LED Indication
No node ID	The Z-Wave Controller does not allocate a node ID to the Switch.	2-second on, 2-second off
Inclusion	1. Have Z-Wave Controller entered inclusion mode.	Press On, for on Press Off, for off
	2. Pressing On/Off button three times within 1.5 seconds will enter inclusion mode.	
Exclusion	1. Have Z-Wave Controller entered exclusion mode.	Press On, for on Press Off, for off
	2. Pressing On/Off button three times within 1.5 seconds will enter exclusion mode.	
	Node ID has been excluded.	2-second on, 2-second off
Reset	1. Pressing On/Off button three times within 1.5 seconds will enter inclusion mode.	Press On, for on Press Off, for off
	2. Within 1 second, press On/Off button again for 5 seconds until LED is off.	
	3. IDs are excluded.	2-second on, 2-second off
Association	1. Have Z-Wave Controller entered association mode. Or Pressing On/Off button three times within 1.5 seconds will enter	Press On, for on Press Off, for off

	association mode	
	2. There are only one group for the switch	

※Including a node ID allocated by Z-Wave Controller means inclusion. Excluding a node ID allocated by Z-Wave Controller means exclusion.

※Failed or success in including/excluding the node ID can be viewed from the Z-Wave Controller.

LED Indication

To distinguish what mode the switch is in, view from the LED for identification.

State Type	LED Indication
Normal	Under normal operation, toggle On/Off button between On and Off. When pressing On, LED lights up, whereas Off, LED is off.
No node ID	Under normal operation, when the Switch has not been allocated a node ID, the LED flashes on and off alternately at 2-second intervals. By pressing On/Off button, it will stop flashing temporarily. However, after unplugging and reconnecting the Switch, the LED will flash on and off alternately at 2-second intervals.
Overload	When overload state occurs, the Switch is disabled of which LED flashes on and off alternately at 0.5 second intervals. Overload

	state can be cleared by unplugging and reconnecting the Switch to the wall outlet.

Choosing a Suitable Location

1. Do not locate the Switch facing direct sunlight, humid or dusty place.
2. The suitable ambient temperature for the Switch is 0°C~40°C.
3. Do not locate the Switch where exists combustible substances or any source of heat, e.g. fires, radiators, boiler etc.
4. After putting it into use, the body of Switch will become a little bit hot of which phenomenon is normal.

Installation

1. Plug this On/Off Switch into a wall outlet near the load to be controlled.

2. Plug the load into the Switch. Make sure the load to be controlled cannot exceed 1500 watts.

3. Press the button or switch on the load to the ON position.

4. To manually turn ON the Switch, press and release the On/Off button. The LED will turn ON, and the load plugged into the Switch will also turn ON.

5. To manually turn OFF the Switch, simply press and release the On/Off button.

The LED will turn OFF and the load plugged into the Switch will also turn OFF.

Programming

1. **Basic Command Class / Binary Switch Command Class**

    The Switch will respond to BASIC and BINARY commands that are part of the Z-Wave system.

 1-1 BASIC_GET / BINARY_SWITCH_GET

  Upon receipt of the following commands from a Z-Wave Controller, the Switch will report its On/Off state to the Controller.

Basic Get Command: **[Command Class Basic, Basic Get]**
Basic Report Command: Report OFF: **[Command Class Basic, Basic Report, Value = 0(0x00)]** Report ON:**[Command Class Basic, Basic Report, Value = (255)0xFF]**

Binary Switch Get Command:**[Command Class Switch Binary, Switch Binary Get]**
Binary Switch Report Command: Report OFF:**[Command Class Switch Binary, Switch Binary Report, Value =0(0x00)]** Report ON:**[Command Class Switch Binary, Switch Binary Report, Value = (255)0xFF]**

1-2 BASIC_SET / SWITCH_BINARY_SET

Upon receipt of the following commands from a Z-Wave Controller, the load attached to the Switch will turn on or off.

[Command Class Basic, Basic Set, Value = (255)0xFF]: the load attached to the Switch turns on.

[Command Class Basic, Basic Set, Value = 0(0x00)]: the load attached to the Switch turns off.

[Command Class Switch Binary, Switch Binary Set, Value = (255)0xFF]: the load attached to the Switch turns on.

[Command Class Switch Binary, Switch Binary Set, Value = 0(0x00)]: the load attached to the Switch turns off.

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2. Z-Wave's Groups (Association Command Class Version 1)

The Switch can be set to send reports to control associated Z-Wave devices. It supports one association group with one node support for Grouping 1. For grouping 1, the Switch will report its latest status to Z-Wave Controller.

Grouping 1 includes, SWITCH_BINARY_REPORT, METER_REPORT_COMMAND

2-1 Auto report to Grouping 1 (Maximum Node 1)

2-1-1 On/Off Event Report

When "on" or "off " state has been changed, it will send Binary Switch Report to the nodes of Grouping 1.

Binary Switch Report

ON:**[Command Class Switch Binary, Switch Binary Report, Value =(255)0xFF]**

OFF:**[Command Class Switch Binary, Switch Binary Report, Value =0(0x00)]**

2-1-2 Instant Power Consumption vary over 5% report

When the power consumption of load vary over 5%, it will send Meter report to the nodes of Grouping 1.

Meter Report Command: **[Command Class Meter，Meter Report，scale(bit 2) +Rate Type +Meter Type，Precision + Scale(bit 1,0)+ Size，Meter Value 1，Meter Value 2，Meter Value 3，Meter Value 4]**

2-2 Response to Meter Get Command

The Switch will report its (1) instant Power Consumption (Watt) or (2) accumulated power consumption(KWH) or (3) AC load Voltage (V) or (4) AC load current (Ⅰ) (5) load power factor (PF) to Z-Wave Controller after receive the Meter Get

Command from Z-Wave Controller.

2-2-1 Instant Power Consumption (Watt) of Switch

When receiving Meter Get Command, it will report Meter Report Command to the

node.

Meter Get Command: **[Command Class Meter, Meter Get, Scale =0x02(W)]**

Meter Report Command: **[Command Class Meter，Meter Report，scale(bit 2) +Rate Type +Meter Type，Precision + Scale(bit 1,0)+ Size，Meter Value 1，Meter Value 2，Meter Value 3，Meter Value 4]**

Rate Type = 0x01

Meter Type = 0x01

Precision = 1

Scale = 0x02(W)

Size = 4 Bytes (Meter Value)

Meter Value 1 = (W) MSB

Meter Value 2 = (W)

Meter Value 3 = (W)

Meter Value 4 = (W)LSB

Example:

Meter Value 1 = 0x00 (W)

Meter Value 2 = 0x00 (W)

Meter Value 3 = 0x03 (W)

Meter Value 4 = 0xEA (W)

Meter(W) = Meter Value 3 *256 + Meter Value 4 = 100.2W

2-2-2 Accumulated Power Consumption (KW/h)

When receiving Meter Get Command, it will report Meter Report Command to

the node.

Meter Get Command: **[Command Class Meter, Meter Get, Scale = 0x00 KW/h)]**

Meter Report Command: **[Command Class Meter，Meter Report，scale(bit 2) +Rate Type +Meter Type，Precision + Scale(bit 1,0)+ Size，Meter Value 1，Meter Value 2，Meter Value 3，Meter Value 4]**

Rate Type = 0x01

Meter Type = 0x01

Precision = 2

Scale = 0x00 (KWh)

Size = 4 bytes (Meter Value)

Meter Value 1 = (W) MSB

Meter Value 2 = (W)

Meter Value 3 = (W)

Meter Value 4 = (W) LSB

Example:

Scale = 0x00 (KWh)

Precision = 2

Size = 4 Bytes (KW/h)

Meter Value 1 = 0x00(W)

Meter Value 2 = 0x01(W)

Meter Value 3 = 0x38(W)

Meter Value 4 = 0xA3(W)

Accumulated power consumption (KW/h) = (Meter Value 2*65536) + (Meter Value 3*256) + (Meter Value 4) = 800.35 (KW/h)

2-2-3 Clearing accumulated power consumption

Meter Reset Command: **[Command Class Meter, Meter Reset]**

2-2-4 AC load Voltage (V)

When receiving Meter Get Command, it will report Meter Report Command to the node.

Meter Get Command: **[Command Class Meter, Meter Get, Scale =0x04(V)]**

Meter Report Command:
[Command Class Meter，Meter Report，scale(bit 2) +Rate Type +Meter Type，Precision + Scale(bit 1,0)+ Size，Meter Value 1，Meter Value 2]

Rate Type = 0x01

Meter Type = 0x01

Precision = 1

Scale = 0x04(V)

Size = 2 Bytes (Meter Value)

Meter Value 1 = High Byte (V)

Meter Value 2 = Low Byte (V)

Example:

Scale = 0x04 (V)

Precision = 1

Size = 2 (2 Bytes of V)

Meter Value 1 = 0x09(V)

Meter Value 2 = 0x01(V)

AC load Voltage = (Meter Value 1*256) +(Meter Value 2)= 230.5 (V)

2-2-5 AC load current (I)

When receiving Meter Get Command, it will report Meter Report Command to the node.

Meter Get Command: **[Command Class Meter, Meter Get, Scale =0x05(I)]**

Meter Report Command:
[Command Class Meter，Meter Report，scale(bit 2) +Rate Type +Meter Type，Precision + Scale(bit 1,0)+ Size，Meter Value 1，Meter Value 2]

Meter Get Command: **[Command Class Meter, Meter Get, Scale =0x06(PF)]**

Meter Report Command:
 [Command Class Meter，Meter Report，scale(bit 2) +Rate Type +Meter Type，Precision + Scale(bit 1,0)+ Size，Meter Value 1]

Rate Type = 0x01

Meter Type = 0x01

Precision = 2

Scale = 0x05(I)

Size = 2 Bytes (Meter Value)

Meter Value 1 = High Byte (I)

Meter Value 2 = Low Byte (I)

Rate Type = 0x01

Meter Type = 0x01

Precision = 2

Scale = 0x06(PF)

Size = 1 Bytes

Meter Value 1

Example:

Scale = 0x05 (I)

Precision = 2

Size = 2 (2 Bytes of I)

Meter Value 1 = 0x01(I)

Meter Value 2 = 0x21(I)

AC load current = (Meter Value 1*256) +(Meter Value 2)= 2.89 (A)

Example:

Scale = 0x06 (PF)

Precision = 2

Size = 1 (1 Byte of PF)

Meter Value 1 = 0x63(PF)

Load power factor (PF) = Meter Value 1 =0.99

2-2-6 load power factor (PF)

   When receiving Meter Get Command, it will report Meter Report Command to the

3. Z-Wave's Configuration

Configuration Parameter	Function	Size (Byte)	Value	Unit	Default	Description
1	Watt Meter Report Period	2	0x01- 0x7FFF	5s	720	5*720s=3600s=1 hour
2	KWH Meter Report Period	2	0x01- 0x7FFF	10min	6	6*10min= 1 hour
3						

3-1 Watt Meter Report Period:

If the setting is configured for 1hour (set value =720), the PAN11 will report its instant power consumption every 1 hour to Z-Wave Controller. The maximum interval to report its instant power consumption is 45 hours (5s*32767/3600=45hr).

3-2 KWH Meter Report Period:

If the setting is configured for 1hour (set value =6), the PAN11 will report its Accumulated Power Consumption (KW/h) every 1 hour to Z-Wave Controller. The maximum interval to report its Accumulated Power Consumption (KW/h) is 227.55 days (10min*32767/1440=227.55 days).

4. Command Classes

The Switch supports Command Classes including…

* COMMAND_CLASS_SWITCH_BINARY

* COMMAND_CLASS_BASIC

* COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2

* COMMAND_CLASS_VERSION

* COMMAND_CLASS_SWITCH_ALL

* COMMAND_CLASS_ASSOCIATION_V1

* COMMAND_CLASS_METER_V3

* COMMAND_CLASS_CONFIGURATION

Socket Type

Since the socket type for each country in Europe varies, refer to the outline for each socket suited for each country as follows:

Germany type PAN11-1

France type PAN11-2

UK type PAN11-3

PAN11-4 (USA/Canada)
PAN11-5 (Taiwan/JP)

Note: Please make sure that the intensity of the plug of the electrical device must be 16A and have same head as the enclosed plug before inserting to the socket.

Troubleshooting

Symptom	Cause of Failure	Recommendation
The Switch not working and LED off	1. The Switch is not plugged into the electrical outlet properly 2. The Switch break down	1. Check power connections 2. Don't open up the Switch and send it for repair.
The Switch LED illuminating, but cannot control the ON/OFF Switch of the load attached	Check if the load plugged into the Switch has its own ON/OFF switch	Set the ON/OFF switch of the load attached to ON
The Switch LED illuminating, but the	1. Not carry out association	1. Carry out association 2. Wait for a while to re-try

Detector cannot control the Switch	2. Same frequency interference	
LED keep flashing, but cannot control	Overload occurs	Remove the load attached or check max. load cannot exceed 1550W~17000W

Specification

Operating Voltage	100~240VAC / 50-60Hz
Maximum Load	1500W for UL/TW/JP
Range	Minimum 30 m in door 70m outdoor line of sight
Operating Temperature	0°C ~ 40°C
Frequency Range	908.42 MHz /UL; 922~926 MHz /TW/JP

** Specifications are subject to change and improvement without notice.

FCC ID : RHHPAN11

Warning:

1.Plug out to disconnect from power supply; Do not plug in line.

2. Do not exceed the max rating

Disposal

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

Company of License Holder：Philio Technology Corporation
Address of License Holder：8F.,No.653-2,Zhongzheng Rd., Xinzhuang Dist., New Taipei City 24257,Taiwan(R.O.C)

FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.